

WHAT IS CLAIMED:

1. An animation device for generating movements of limbs and extremities of an animated figure, said animation device comprising:

a single motor coupled to a gear box assembly;

a first drive axle coupled to said gear box assembly, said first drive axle rotatable about a first axis;

a second drive axle coupled to said gear box assembly, said second drive axle rotatable about a second axis, said second drive axle oriented substantially perpendicular to said first drive axle;

a gear train assembly coupled to a lower end of said second drive axle;

an output drive shaft coupled to said gear drain assembly, said output drive shaft rotatable about a third axis oriented parallel to and offset from the second axis;

a left cam coupled to a left end of said first drive axle and a right cam coupled to a right end of said first drive axle, said left and right cam configured for radial movement about said first drive axle when said motor is activated;

a middle cam coupled to a middle section of said second drive axle, said middle cam configured for radial movement about said second drive axle when said motor is activated; and

a lower cam coupled to said output drive shaft, said lower cam configured for radial movement about said output drive shaft when said motor is activated.

2. The animation device according to claim 1, said left cam cooperatively attached to a left arm movement link cooperatively attached to a left arm assembly, wherein motion is induced in said left arm assembly when said motor is activated.

3. The animation device according to claim 1, said right cam cooperatively attached to a right arm movement drive link cooperatively attached a right arm assembly, wherein motion is induced in said right arm assembly when said motor is activated.

4. The animation device according to claim 2, said left arm assembly containing a left shoulder axle having a left inboard retaining boss rotatably attached to a left shoulder bearing journal fixed to said animation device forming a left shoulder joint,

a left input cam coupled to a center section of said left shoulder axle, said left input cam swivel attached to an upper end of said left arm movement link, a left output cam coupled to an outboard end of said left shoulder axle, said left output and input cams configured for simultaneous radial movement about said left shoulder axle, a left arm link swivel attached to said left output cam, and a left forearm cam having a left forearm follower integrally formed with said left forearm cam, wherein motion is induced in said left forearm follower when said motor is activated.

5. The animation device according to claim 3, said right arm assembly containing a right shoulder axle having a right inboard retaining boss rotatably attached to a right shoulder bearing journal fixed to said animation device forming a right shoulder joint, a right input cam coupled to a center section of said right shoulder axle, said right input cam swivel attached to an upper end of said right arm movement link, a right output cam coupled to an outboard end of said right shoulder axle, said right output and input cams configured for simultaneous radial movement about said right shoulder axle, a right arm link swivel attached to said right output cam, and a right forearm cam having a right forearm follower integrally formed with said right forearm cam, wherein motion is induced in said right forearm follower when said motor is activated.

6. The animation device according to claim 1, said hoop movement cam cooperatively attached to an inner hub connected to a midbody perimeter outer frame by a plurality of spokes, said hoop movement cam inducing at least one of gyrating, jerking, tilting, up and down, and rotating movement of said midbody perimeter outer frame when said motor is activated.

7. The animation device according to claim 1, said lower cam cooperatively attached to an arcuate shaped lower cam receiving slot formed in a planar surface of a housing assembly, said receiving slot inducing an upper assembly of said animation device to rotate in a back and forth motion about the second axis when said fourth cam is radially rotated about the third axis when said motor is activated.

8. An animation device for generating movements of limbs and extremities of the animated figure, said animation device comprising a:

a lower motion unit, an upper motion unit, and a chassis adapted to internally house and support said lower and upper motion units;

said lower motion unit comprising,

a first motor coupled to a gear box assembly;

a first drive axle coupled to said gear box assembly, said first drive axle rotatable about a first axis;

a second drive axle coupled to said gear box assembly, said second drive axle rotatable about a second axis, said second drive axle oriented substantially perpendicular to said first drive axle;

a gear train assembly coupled to a lower end of said second drive axle;

an output drive shaft coupled to said gear train assembly, said output drive shaft rotatable about a third axis oriented parallel to and offset from the second axis;

a left cam coupled to a left end of said first drive axle and a right cam coupled to a right end of said first drive axle, said left and right cam configured for simultaneous radial movement about the first drive axle when said first motor is activated;

a middle cam coupled to a middle section of said second drive axle, said middle cam configured for radial movement about the second drive axle when said first motor is activated; and

a lower cam coupled to said gear train assembly, said lower cam configured for radial movement about the third axis when driven by said first motor; and

said upper motion unit comprising,

an upper cam cooperatively engaged to a jaw, the upper cam configured for linear movement along a fourth axis concurrently with pivotal movement about fifth and sixth axes which are both normal to the fourth axis and to each other; and

a second motor coupled to the upper cam and operative to facilitate the movement thereof along the fourth axis concurrently with movement about the fifth and sixth axes.

9. The animation device according to claim 8, wherein the upper cam cooperatively engages to said jaw such that movement of said upper cam about the fourth axis facilitates movement of said jaw between open and closed positions, the movement of said upper cam about the fifth axis facilitating movement of a head portion in an arcuate path between left and right positions, and movement of the upper cam about the sixth axis facilitating movement of said head in an arcuate path between forward and backward positions.

10. The animation device according to claim 8, said left and right cam each having an arm movement link cooperatively connected to a respective left and right moveable arm to produce a back and forth swinging motion in said moveable arms.

11. The animation device according to claim 8, said middle cam cooperatively connected to an inner hub of a midbody perimeter hoop to produce at least one of a twisting, up and down, gyrating and erratic jerking motion of said midbody perimeter hoop.

12. The animation device according to claim 9, a center axis of said midbody perimeter hoop being offset from the second axis, and furthermore, the center axis being tilted with respect the second axis.

13. The animation device according to claim 8, said lower motion unit, upper motion unit, and chassis comprising an upper assembly of said animation device, and said animation device further comprising a lower assembly including a housing having a planar base covered by a revolving plate interconnected to a bottom side of said upper assembly.

14. The animation device according to claim 13, said lower cam engaged to an arcuate shaped receiving slot integrally formed within said planar base to produce a back and forth rotational motion of said upper assembly about the second axis.

15. An animation device comprising:

a body composed of an upper assembly, midbody section, and lower assembly,

said upper assembly having a moveable head with a movable lower jaw hinged to said head, and pair of moveable arms cooperatively attached to a respective pair of shoulders on said upper assembly, said upper assembly further comprising,

an upper drive unit disposed within said upper assembly having a first electric motor coupled to a first gear train, said first gear train coupled to a first at least one cam and follower set, said first at least one cam and follower set cooperatively connected to said moveable head and said lower jaw to produce up and down jaw movement and tilting of said head in a back and forth direction and side to side direction;

a lower drive unit disposed within said upper assembly having a second electric motor coupled to a second gear train, said second gear train coupled to a second at least one cam and follower set cooperatively connected to said pair of moveable arms to produce a back and forth swinging movement in said pair of moveable arms;

said midbody section rigidly connected to said upper assembly and rotatably connected to said lower assembly by a revolving plate, said midbody having a midbody perimeter hoop defining an extremity of said body, said midbody section further comprising a third at least one cam and follower set coupled to said first gear train, said third at least one cam and follower set cooperatively connected to said midbody perimeter hoop to produce at least one of a twisting, up and down, gyrating and erratic jerking motion of said midbody section;

said lower assembly having a base adapted to support said body to a substantially horizontal planar surface, said lower assembly further comprising a third gear train disposed within coupled to a driveshaft coupled to said first gear train, and a fourth at least one cam and follower set cooperatively transferring motion to said revolving plate to produce a back and forth rotation of said upper assembly and said midbody about an axis defined by said driveshaft.

16. The animation device according to claim 15, further comprising a programmable central processing unit for programming at least one of specific dance routines dictated by motions produced by said animation device, specific audible sounds, and operational modes of which said animation device performs.

17. The animation device according to claim 15, further comprising a motion detector which activates said animation device when motion is detected by said detector.

18. The animation device according to claim 15, further comprising an infrared transmitting and receiving feature allowing said animation device to send and receive data over a wireless infrared connection.

19. The animation device according to claim 15, further comprising a body adapted to be exteriorly attached to said animation device.

20. The animation device according to claim 19, said body being a Christmas tree figure.

21. The animation device according to claim 15, further comprising a clutch release mechanism integrated into said driveshaft between said second gear train and said third gear train to prevent damage to said animation device when moving parts of said animated device are inappropriately forced to be moved by a user of the animated device.

22. An animation device comprising:

- a first motor coupled to a first gear train having a first and second output shaft, said output shafts configured perpendicular to each other;

- a left cam radially connected to a left end of said first output shaft, said left cam driving a left follower to induce motion in a left arm assembly;

- a right cam radially connected to a right end of said first output shaft, said right cam driving a right follower to induce motion in a right arm assembly;

- a middle cam radially connected to said output shaft, said middle cam driving a middle follower to induce motion in a midbody perimeter hoop.

23. The animation device according to claim 22, further comprising a first input shaft coupled to a center axis of said middle cam on one end and coupled to a second gear train on the other end, said second gear train having a third output shaft, a lower cam radially connected to said third output shaft, said lower cam interconnected with a lower cam receiving slot for inducing a rotational motion in an upper assembly of said animation device.

24. The animation device according to claim 22, said animation device composed of an upper assembly, midbody section , and lower assembly;

wherein said first motor, first gear train, said left cam, said left follower, said right cam, and said right follower are contained within said upper assembly, and

wherein said middle cam, said middle follower, and said midbody perimeter hoop are exteriorly located proximate the midbody section.

25. The animation device according to claim 23, said animation device further composed of a midbody section , and lower assembly;

wherein said first motor, first gear train, said left cam, said left follower, said right cam, and said right follower being contained within said upper assembly,

wherein said middle cam, said middle follower, and said midbody perimeter hoop are exteriorly located proximate the midbody section, and

wherein said second gear train, said third output shaft, said lower cam, and said lower cam receiving slot are contained within said lower assembly.

26. An animation device comprising:

an upper assembly rotatably interconnected to a lower assembly by a midbody section , said upper assembly comprising,

a first motor coupled to a first gear train having a first and second output shaft, said output shafts configured perpendicular to each other;

a left cam radially connected to a left end of said first output shaft, said left cam driving a left follower to induce motion in a left arm assembly;

a right cam radially connected to a right end of said first output shaft, said right cam driving a right follower to induce motion in a right arm assembly;

a middle cam radially connected to said output shaft, said middle cam driving a middle follower to induce motion in a midbody perimeter hoop, said middle cam, middle cam follower, and midbody perimeter hoop located within the midbody section and between said upper assembly and said lower assembly.

27. The animation device according to claim 26, further comprising a first input shaft coupled to a second gear train having a third output shaft, a lower cam radially

Case No.: SMART-084B

connected to said third output shaft, said lower cam interconnected with a lower cam receiving slot for inducing a rotational motion in said upper assembly of said animation device, wherein said second gear train, said lower cam, and said cam lower receiving slot are contained within said lower assembly.

28. The animation device according to claim 26, wherein said middle cam, said middle follower and said midbody perimeter hoop are mounted to an exterior of said animation device proximate of the midbody section.